

NHSIA Webinar Series

Information and Infrastructure Viewpoints

July 12, 2012

Slide 1 – Information and Infrastructure Viewpoints

Good afternoon. This is Joe Bodmer from the Administration for Children and Families. Welcome to the National Human Services Interoperability Architecture (pronounced niss-e-a) webinar series.

To find the link for this session, please go to ACF's new Interoperability website by typing this URL:

<http://transition.acf.hhs.gov/about/interoperability>

Scroll to the bottom of the page and click on the link for today's session . The text says: Information Overview - Webinar #4 to be presented on July 12, 2012.

Use the following link, to access the July 12 webinar

If you click on the July 12 webinar link, you should be able to join the webinar.

To avoid hearing background noise from your phones we will mute all your lines now. At the end, we'll open the lines to take questions.

Our other speakers today are Beverly Boies and John Tamer from the Johns Hopkins University Applied Physics Laboratory.

Slide 2 - Webinars will be held Thursdays at 1 PM Eastern

This is the fourth in series of 5 webinars to introduce the National Human Services Interoperability Architecture (NHSIA, pronounced niss'-e-a).

This series is intended as an overview of the several hundred pages of NHSIA information being made available on the ACF web site. The time in the webinars is limited. But we hope that the webinars will provide sufficient information to allow you to explore the detailed documentation and **examine the topics of most interest to you** in more detail.

The URL for ACF's new interoperability initiative site is

<http://transition.acf.hhs.gov/about/interoperability> (This is a temporary Web site being used until a newly designed site is available. A link to the new site will be provided from this site.)

We will post the webinar files and additional architecture documents on that new ACF website over the coming weeks.

Slide 3 – Outline

The objectives for this webinar are to understand the types of information that will be shared, the infrastructure concepts, and potential architecture patterns.

Beverly Boies will discuss the Information Viewpoint and John Tamer will lead the Infrastructure Viewpoint portion of this webinar.

There will be a question and answer session at the end. In the meantime, please feel free to enter comments or questions using the Chat tool in the lower right section of your screen.

And now, I will turn this over to Beverly Boies to lead us through the Information Viewpoint.

Slide 4 - This webinar focuses on the artifacts in the Information and the Infrastructure Viewpoints

As you recall from previous webinars, NHSIA is being described from 7 different viewpoints. These are shown in the cube in the lower left corner. Each viewpoint explains a different aspect of the architecture. The two viewpoints we are focusing on today are circled in red: the Information Viewpoint and the Infrastructure Viewpoint.

The documents that describe these viewpoints are listed in the figure and include both viewpoints' descriptions. The Security white paper shown under the Overview Viewpoint provides additional details relevant to the Infrastructure Viewpoint.

Before we proceed further, let me take this opportunity to repeat the instructions for getting to the Web portion of this webinar in case some of you who just dialed in are having trouble finding it.

Please go to ACF's new Interoperability website by typing this URL:

<http://transition.acf.hhs.gov/about/interoperability>

Scroll to the bottom of the page and click on the blue link for today's session labeled Information Overview – Webinar #4 the July 12 webinar.

Slide 5 – Information Viewpoint

The Information Viewpoint **describes the business information requirements for the NHSIA architecture**. The Information Viewpoint leverages existing data standards and ongoing standardization efforts in the area of Health and Human Services.

The Information Viewpoint supports NHSIA goals by:

- Establishing a **common vocabulary** for conversations among human service agencies, programs, and supporting IT teams;
- It also supports the goals by promoting **the development and use of standards for data exchange**.

Slide 6 - The Information Viewpoint Comprises 3 Primary Components

Today we will cover the three primary components in the Information Viewpoint.

The **conceptual data model** was derived by analyzing the information needs of the business processes defined in the NHSIA Business Viewpoint. **The CDM provides a vocabulary** used in the other viewpoints.

The model itself is a complex diagram built using a modeling tool. The model identifies classes, attributes, and associations among classes. In this context "class" refers to a real-world object or a

noun that represents structured information. This model forms the basis for the information exchanges and for potential data structures.

Contained in the information exchange spreadsheet lists and description of several core **information exchanges** between stakeholders and identifies one or more IT services from the Systems Viewpoint that would use each information exchange.

The Information Viewpoint identifies applicable standards for data definition, message coding, and exchange protocols.

One of the key standards is the **National Information Exchange Model, often called by its acronym, NIEM**. To show **how NHSIA relates to NIEM**, the Information Viewpoint provides a data dictionary for the attributes in the CDM mapped to NIEM elements.

Slide 7 – Audience for the Information Viewpoint

The intended audience for the Information Viewpoint includes **the developers of the other NHSIA Viewpoints**. This viewpoint provides them with a **common vocabulary across human services programs** that can be used to describe information structures and exchanges.

A second part of the audience for the Information Viewpoint is **the state and local planners and system architects**. They can also use the common vocabulary as a basis to begin to plan for and design information structures and exchanges.

The third part of the audience is the **federal and state program managers, who** are responsible for establishing consistent definitions and standards for reporting and information exchanges.

Slide 8 – How NHSIA Information Viewpoint Relates to the Other Architecture Viewpoints

You may recall this figure from a previous webinar. This diagram uses different colored boxes for different viewpoints. Starting at the top center, the green boxes show the structure of the NHSIA business model. In this structure, business areas are decomposed into business processes; processes are decomposed into activities. Each activity is defined in terms of:

- Stakeholders who are involved in the activity
- information inputs and outputs, and
- different actions performed as part of the activity

Now focus on the turquoise boxes, they represent the information inputs and outputs for a business activity and represent potential information exchanges.

The Information Viewpoint describes core information exchanges. This viewpoint also maps those exchanges to core IT services from the Systems Viewpoint tying the two viewpoints together.

Slide 9 - Conceptual Data Model

The conceptual data model, or CDM, is at the heart of the Information Viewpoint.

Slide 10 - Information Viewpoint Classes of Information Related to Stakeholders

The CDM is a class model developed in the Unified Modeling Language (**UML**). UML is a modeling technique widely used in the field of object-oriented software engineering.

UML uses **Data Classes** to organize information into logical and orderly groupings. A data class refers to a person, place, or thing. We identified **Attributes** for each data class. Attributes provide detailed characteristics of the data class.

This slide depicts the NHSIA core business stakeholders and the NHSIA CDM data classes associated with those stakeholders. This represents a subset of all the classes in the model.

Slide 11 – Conceptual Data Model (CDM)

This slide looks at a specific example of a data class: a Person.

In this example the “Person” class has attributes and has a relationship with another class, “PersonAlternateIdentifiers”. The “Person” class has two attributes: “personFullName” and “personIdentifier”. The “PersonAlternateIdentifiers” class has ten attributes, such as “driversLicenseNumber” and “passportNumber”. The line between the two classes is a relationship, in this case a Person “is identified by” a Person Alternate Identifier.

The detailed definition shown in this example was developed using an iterative process that looked at business activities and their inputs and outputs and used this as a basis for initial class definitions.

Scenarios and vignettes were analyzed to add more details. In the systems viewpoint, services were defined and this provided another perspective on information required in the CDM. Several iterations led to the initial version of the CDM that provided an information vocabulary with enough precision to clearly communicate architectural concepts.

As a result of the data dictionary mapping of the CDM attributes to NIEM, NHSIA confirmed the use of NIEM and identified gaps in classes and attributes that can be defined by NIEM Human Service domain stewards.

Going forward, NIEM will provide the vocabulary needed to specify information exchange standards.

Slide 12 – Conceptual Data Model (CDM) – Person Excerpt

This is a partial view of the CDM. It shows the subsection of the CDM associated with an individual person who is or has been a client in a case. Each box represents a class.

Although the details are obscured by the small size of the text, you can see that there are 17 classes in this view and each class has a series of related attributes. The complete Conceptual Data Model includes 54 data classes and over 350 attributes (367 to be exact). The model describes and defines each data class and data attribute.

The NHSIA Conceptual Data Model is useful because it defines a consistent vocabulary for information elements and the relationships among those elements. It defines these in a way that is sufficiently

detailed for technologists such as systems architects and software engineers to develop standards and designs for information exchanges and structures.

Slide 13 - Information Exchanges

The next topic we want to address in the Information Viewpoint is Information Exchanges.

Slide 14 - Information Exchanges Support Operations

Simply stated: **An information exchange is a set of data transferred between stakeholders in support of a business process.** Information exchanges refer to data in motion, as contrasted with data at rest that is stored in a database or file.

Information exchanges are used to move human service information electronically across separate systems used by different stakeholders. The systems may be operated by different agencies, counties, states, regions, or programs.

For example, Children, Youth, and Family Services and the Justice Department need a way to share information to collaborate on behalf of clients. Information exchanges enable this sharing and collaboration.

Slide 15 - Information Exchange Spreadsheet Provides Details

The background of this slide is an excerpt from the Information Exchanges spreadsheet.

The spreadsheet lists several core information exchanges and for each one provides a description, the contents, the source organization type, destination organization type, and IT service designator.

The spreadsheet uses the vocabulary established by the CDM to describe the exchange contents.

The NIEM Human Services Domain stewards may use this as a starting point for ideas about what information exchanges would promote interoperability.

Slide 16 - Information Exchanges Facilitate Information Sharing

The Information Viewpoint promotes the facilitation of information sharing between states, programs and authoritative sources (for example, the Department of Homeland Security (**DHS**), Internal Revenue Service (**IRS**), and the Social Security Administration (**SSA**)).

This is similar to what the Centers for Medicare & Medicaid Services (CMS) is doing with their Data Services Hub.

In the example illustrated in the slide, a case worker is verifying the citizenship status, residency status, social security number, and income of a client.

Through IT services provided by her county systems, she is able to access services at the state and federal level to verify the information provided by the client against authoritative sources.

Ideally, the format and content of the information exchanges would be defined using a NIEM standard.

Slide 17 - NHSIA and the National Information Exchange Model (NIEM)

The third and final topic we want to address in the Information Viewpoint is the National Information Exchange Model, or NIEM.

A document called “What is NIEM” provides this summary:

“NIEM enables diverse communities to “speak the same language” as they share, exchange, accept, and translate information efficiently.”

NIEM grew out of efforts in the justice domain, but now encompasses many different communities.

NIEM...

- Is a foundation for information exchange
- NIEM provides a process for defining the contents of messages exchanged between two organizations, and
- NIEM provides a common vocabulary for repeatable, consistent exchange of information.

NHSIA focuses on NIEM because NIEM defines standard information exchanges which are needed for human services operations.

If a state has well-integrated systems that already share information effectively using a shared infrastructure, it probably won't need to use NIEM-based standards within the state. But for sharing information between jurisdictions or between agencies whose information systems are not integrated, **NIEM-based standards make information exchange easier and re-usable.**

Slide 18 - From George Sheldon's Testimony April 19, 2012 before the Committee on Ways and Means, U.S. House of Representatives

George Sheldon's testimony to the U.S. House of Representatives in April of 2012 states that ACF is developing a NIEM-based model for commonly used human services terminology and implementing information exchanges across human services.

There is now an official NIEM Human Services Domain and ACF is the steward of that domain. ACF will be posting planning documents on the NIEM website for review and comment. The ACF support includes sub-groups to coordinate with Centers for Medicare & Medicaid Services and its Center for Consumer Information and Insurance Oversight.

Slide 19 - Scope of NIEM

NIEM is designed to ***develop, disseminate, and support enterprise-wide information exchange standards*** that can enable jurisdictions to effectively share critical information in emergency situations, as well as support the day-to-day operations of agencies throughout the nation.

This diagram shows NIEM's focus on managing the message within the information exchange. In this example, two systems need to exchange information. System A has some Import/Export Translator software that will convert the System A internal data formats to the NIEM, XML-based standard format.

System B has an associated Import/Export Translator that translates the message to its internal format. System B then processes the message.

Although, this diagram shows a one way message transfer; most NIEM messages will occur in a **request and response pair**.

Note that NIEM does not concern itself with the internal formats of any system. It does not specify the technical messaging protocols that implement the message transfer. And, NIEM is not a database or a system. NIEM simply describes the format and content of the **data that is in motion in the exchange**.

Slide 20 - A NIEM Example: Define Transaction Once, Use It Often

This slide illustrates a **theoretical example** in which Florida's Children, Youth, and Families and Florida's Court Systems will work with the state of Georgia to authorize the custody transition of a child to a distant relative in Georgia.

Let's walk through this slide starting at the top left. By defining business activities associated with intake, needs assessment, service history and planning, NHSIA sets a context for information exchanges. Those information exchanges inform the NIEM processes involved with defining standard Information Exchange Package Documentation or IEPD. In this case, the exchange package of interest relates to sharing summary information about an adoption case.

The stack of icons on the left shows information sharing among Florida agencies or programs using the NIEM-based Adoption Case Information Summary exchange package.

On the right, Georgia can leverage the existing Florida NIEM exchange efforts to create an exchange with Florida.

So, the concept behind information exchange standards is to define a transaction once and re-use that IEPD definition often. Different exchange partners can tailor the IEPD standard to meet their needs.

Slide 21 - NHSIA Supports the First Two phases of NIEM IEPD Life Cycle Development

This diagram shows the six phases of the NIEM Lifecycle for Information Exchange Package Documentation development. An IEPD specifies the construction and content of a particular information exchange. NHSIA supports the first two phases of developing an IEPD so we emphasize those in this webinar.

In the Scenario Planning phase ,NHSIA helps to identify the high-level business cases and the information needed to support them by capturing and defining core business areas and business processes from the Business Viewpoint. Also in this phase NHSIA identified potential Information Exchanges from the Business Viewpoint vignettes.

In the Analyze Requirements phase NHSIA helps to identify the business context, creates a model for information exchanges, and maps data to the existing NIEM vocabulary. This is done by providing the context for exchanges, **as the Business Viewpoint identifies inputs and outputs which are mapped to supporting information flows**. In addition, the CDM provides a starting point and vocabulary for

defining the content of NIEM exchanges. While a separate Information Exchanges spreadsheet identifies several possible high-priority exchanges.

In the Analyze Requirements Phase of the NIEM lifecycle the Information Viewpoint also maps those **data requirements from the CDM to existing NIEM elements.**

Slide 22 - NIEM IEPD Develops Artifacts in Every Phase of the Life Cycle (1)

The Map & Model phase results in the creation of many artifacts including an Exchange Content Model and a Mapping Document.

The Build and Validate phase's artifacts include NIEM XML Schemas and XML Wantlists.

Slide 23 - NIEM IEPD Develops Artifacts in Every Phase of the Life Cycle (2)

In the Assemble & Document phase developers create many artifacts including an IEPD Master Document

The Publish & Implement phase is to publish the completed IEPD.

A variety of tools exist to support different phases in the IEPD development lifecycle. Many of these tools are "free" to use, although some require licenses and/or training.

Slide 24 - Information Exchange

This slide illustrates an actual information exchange.

The tan box on the left lists several of the artifacts in the information exchange package documentation.

In the orange and yellow boxes in the middle, that documentation steers the population of an actual XML exchange message from information that may be held in a source database. The XML Exchange Message is created and wrapped **following agreed-upon exchange protocols for routing, security and authentication.** The message is then transmitted by an exchange method, such as a Web Service.

There are many methods of Information Exchange Package (IEP) delivery such as:

- Web services
- Message queuing
- Message switching or brokering, or
- Enterprise Service Bus

The **method of exchange must be agreed upon between two stakeholders so that their systems can exchange information successfully.**

As I mentioned earlier, with NIEM, the information exchange specification is available for re-use by other jurisdictions, once the initial exchange has been created and published and typically involve two exchanges messages, a Request and Response message pair.

Slide 25 - Using the Income Verification Exchange

Let's look at another theoretical example.

In this scenario Jane Doe authorizes Children Youth & Family Services (CYFS) to verify her household income with the IRS. The authorization is captured electronically in Client Release Authorizations and is one aspect of how NHSIA addresses security and confidentiality.

The state and the IRS have established business rules and agreements about who is able to request income verification. The business rules and access authorization are verified electronically, which is another aspect of how NHSIA addresses access to sensitive information.

In box 1, the state system checks that Jane Doe authorized contacting the IRS to verify her income data. Then the state system sends the NIEM REQUEST information exchange package to the IRS.

The IRS validates that the REQUEST is legitimate and access is authorized.

In box 2, the IRS sends back the RESPONSE information exchange package to verify Jane Doe's Household Income.

So in this example, a NIEM transaction is used to share information between an authorized state agency and a federal government agency.

Slide 26 - XML Sample Contained within an Information Exchange Package (IEP)

This final slide shows what part of an actual exchange (an information exchange package, or IEP) might look like. The blue data about our fictitious Jane Doe is surrounded by XML tags. This is just a small sample of XML for those non-techies in the audience.

That concludes my presentation about the Information Viewpoint. I hope you have a little better understanding of what NHSIA brings to the table regarding the information that you want to share to support human services. The viewpoint includes a conceptual data model, a list of information exchanges, and artifacts that relate NHSIA to NIEM.

Now I'll hand off to John Tamer who will guide us through the Infrastructure Viewpoint.

Slide 27 - Infrastructure Viewpoint

Next we will discuss the NHSIA Infrastructure Viewpoint. The Infrastructure Viewpoint describes the components necessary to facilitate interoperability among participants in the health and human services environment. This includes organizations ranging from the Federal government to the individual beneficiary of services.

We recognize the fact that many human services organizations have made or are currently making significant investments in systems and technology infrastructure. This viewpoint presents an approach that works with the constraints of already established infrastructure environments, but is geared towards leveraging advances in technology with the goal of not only increasing interoperability, but reducing costs and improving process efficiency.

Slide 28 - The Infrastructure Viewpoint : Primary Components

The Infrastructure Viewpoint contains three primary components. These are:

- Fundamental Infrastructure Concepts, which describes some of the key infrastructure technology trends and their uses and benefits in the NHSIA architecture.
- Infrastructure Architecture Patterns, which presents the types of infrastructure implementations needed to achieve interoperability and presents a series of patterns that address common cross-organizational interoperability and integration challenges.
- Pattern Use Cases and Implementation Considerations, which describe how architecture patterns may be implemented and presents factors that may influence those implementation decisions.

Slide 29 - Audience for the Infrastructure Viewpoint

Infrastructure is defined here as the hardware, networks and software required to deliver information technology applications and services.

The primary audience for this viewpoint includes 3 types of stakeholders:

Developers of the other NHSIA Viewpoints who can use the description of infrastructure components and patterns that under pin all NHSIA capabilities to ensure that infrastructure components exist upon which to build these capabilities.

State, local, and private provider planners and system architects can use the viewpoint as a framework for examining interoperability and infrastructure requirements across programs to identify opportunities for integration and resource sharing.

Finally, Federal Program Managers can use this viewpoint as a starting point and reference model for Federal programs (e.g., TANF, LIHEAP) looking to adapt the NHSIA model for their business operations.

Slide 30 - Fundamental Infrastructure Concepts

The next section introduces the fundamental infrastructure concepts.

Slide 31 - Fundamental Infrastructure Concepts

You may recall from earlier sessions that NHSIA will be implemented via an evolutionary approach. This involves creating a core set of essential capabilities that everyone needs. These core capabilities enable critical information sharing and create an environment that allows new capabilities to evolve more easily.

Defining a NHSIA core provides a clear target for initial implementation. The core NHSIA capabilities therefore provide a foundation for interoperability among programs, agencies/organizations, and jurisdictions as well as foundational technical capabilities or information.

Fundamental to the NHSIA core are the infrastructure concepts described here. These are:

A service-oriented architecture infrastructure in each IT environment that supports human services to provide the foundation for IT service discovery and re-use

A shared technology infrastructure, called hubs in the NHSIA core.

And, security and privacy. This includes single sign-on and attribute-based access control to streamline the user's experience and abide by confidentiality agreements

Slide 32 - Service-Oriented Architecture

Service-oriented architecture (SOA) is a methodology for systems development and integration where functionality is grouped around business processes and packaged as interoperable services.

An SOA typically contains an IT infrastructure which allows different applications to exchange data with one another as they participate in business processes.

Service-Oriented Architecture is one of the key features of the MITA 3.0 technical architecture. According to the MITA framework, "service-oriented architecture (SOA) is a software design strategy that packages common functionality and capabilities (services) with standard, well-defined service interfaces, to produce formally described functionality that can be invoked using a published service contract. Service users need not be aware of "what's under the hood."

SOA separates functions into distinct units, or services, which are made accessible over a network so that they can be combined and reused in the production of business applications. These services communicate with each other by passing data or by coordinating an activity between two or more services.

Slide 33 - Benefits of SOA

MITA 3.0 also describes several benefits of using an SOA. These are:

Enables Increased Business Agility

- Change and uncertainty are common across the HHS domain

- SOA allows businesses to respond more quickly

Allows Business, Not Technology, to Drive the Enterprise

- Technology revolves around business processes

- More focused on business mission than IT implementation

Facilitates Greater Reuse of Common Services

- Common services can be used across multiple organizations

- Reduces cost, schedule and risk while increasing collaboration and consistency

- Examples of common services might be a master person index lookup function or an income verification service

Facilitates Insertion of New Technology

- Business functionality is abstracted from the technology layer

- Insertion of new technology is more transparent to end users

Slide 34 - Shared Infrastructure

As we said earlier, NHSIA will be implemented via an evolutionary approach. The architecture suggests a core set of essential capabilities that everyone needs.

A key aspect of the NHSIA Core is the creation of a hub

A hub is a place within the service-oriented IT used to host services, applications, and information to be shared externally.

Services hosted in a hub will vary by jurisdiction, but may include components such as a master person index or provider registry

Slide 35 - Benefits of Shared Infrastructure

Many benefits can be achieved through the use of a shared infrastructure.

A shared infrastructure reduces the need for multiple point-to-point connections between organizations. In other words, all connects between organizations require only one connection to the hub.

A hub creates a centralized starting point for access to shared data. Storing data in a common environment provides cross-organization data analysis and reporting. Data can be sent to the common environment, transformed into a standard format and stored for subsequent retrieval. Combining data in a common environment means that organizations have a centralized starting point for access to shared data. Further, data can be retrieved without imposing a processing burden on the source system.

Provides the infrastructure needed to develop and deploy common applications and services. Rather than running an application instance for each organization, as is done for on-premises, multiple organizations may use a single instance of the application simultaneously.

Cloud computing is one option for creating a NHSIA hub. The graphic to the right illustrates the key aspects of cloud computing as defined by the National Institute of Standards and Technology.

Slide 36 - Security and Privacy

Information security and privacy foundations must be in place to facilitate secure collaboration and information sharing.

The NHSIA Security White Paper augments the NHSIA Infrastructure viewpoints by providing additional guidance on security-related topics relevant to jurisdictions planning to adopt the NHSIA framework.

Topics include:

- Identity Management and Access Control
- Network and Infrastructure Security
- Privacy and Confidentiality
- Contingency Planning and Disaster Recovery

Slide 37 - Architecture Patterns

We turn next to a discussion of architecture patterns.

Slide 38 - NHSIA Architecture Patterns

Architectural patterns are generalized descriptions of activities, service functionality and system functionality and their resources, providers and information/data resource flows. The use of patterns is common in software engineering and is intended to keep organizations from having to repeatedly solve the same problems.

Patterns are based on industry best practices and are general enough to be applicable across a variety of situations.

NHSIA infrastructure patterns describe types of infrastructure implementations needed to achieve cross-organizational interoperability and integration challenges.

Five categories of patterns are included:

- Information Aggregation
- Collaboration
- Self-Service
- Extended Enterprise
- Business Intelligence and Analytics

Slide 39 - NHSIA Architecture Pattern Example: Information Aggregation Pattern

The Information Aggregation pattern is one example of an Infrastructure pattern.

Information Aggregation patterns integrate data across multiple sources, formats and locations. There are four sub-patterns included:

- Federation, which provides access to multiple data sources across multiple locations,
- Population, which gathers data from one or more sources, processes that data and applies it to some data target,
- Synchronization, which keeps data consistent across locations, and
- Information Access, which provides end-user and application access to data

Slide 40 - Pattern Use Cases and Implementation Considerations

Finally, we will discuss pattern use cases and implementation considerations.

Slide 41 - NHSIA Architecture Pattern Example: Information Aggregation Use Case

Information Aggregation patterns must be implemented in such a way as to support source data from a variety of sources in a variety of formats.

This diagram illustrates a number of ways in which data can be transferred, transformed and aggregated. The infrastructure must be capable of processing and transforming the incoming data into useable formats. This is accomplished via adaptors.

In addition, a number of IT components are used to implement this pattern, including:

- Enterprise Service Bus

Web Services
Web Servers
Application Servers
Data Integration Servers

That concludes the material about the Infrastructure Viewpoint.

Joe, back to you.

Slide 42 - Summary

No notes.

Slide 43 - Information and Infrastructure Viewpoint Summary

This slide summarizes what you've heard today.

About the Information Viewpoint...:

- The conceptual data model defines elements in the NHSIA common vocabulary and helped to identify initial requirements for information exchanges.
- Information exchanges are key to interoperability.
- NIEM provides a common vocabulary, process, and model for messages exchanged.

Shifting to the Infrastructure Viewpoint...:

- Fundamental infrastructure concepts include implementing a service-oriented architecture, sharing infrastructure components to leverage the investment, and adopting standard best practices to achieve secure interoperability and data sharing.
- The NHSIA Infrastructure Viewpoint identifies architecture patterns that can provide a starting point for thinking about and planning for interoperability. The Infrastructure Viewpoint provides guidance on how best to implement and deploy the patterns. The viewpoint identifies 5 categories of patterns:
 - Information Aggregation
 - Collaboration
 - Self-Service
 - Extended Enterprise
 - Business Intelligence and Analytics

Slide 44 - Questions and next steps

No notes.

Slide 45 - Questions?

Now we'll open the phone lines and take your questions. If you aren't speaking, please mute your phone by pressing *6. To speak, press *6 again. Any questions?

Slide 46 - NHSIA Documents Related To This Webinar

This slide lists the NHSIA documents that are related to the Information and Infrastructure Viewpoints. They will be available from the ACF Interoperability website.

The URL for the site is <http://transition.acf.hhs.gov/about/interoperability>

Slide 47 - Webinars will be held Thursdays at 1 PM Eastern

The fifth and final webinar in this series is scheduled for two weeks from today, Thursday, July 26th at 1:00 PM Eastern.

Slide 48 - Next webinar: Systems Viewpoint and Webinar Series Wrap-Up

Here is the draft outline for next time.

Slide 49 - Thank you for participating and see you next time!

Thank you for joining us today. See you next time!